DEPARTMENT OF PRODUCTION ENGINEERING

NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

COURSE PLAN – PART I			
Name of the programme and specialization	**M. Tech. & Industrial Engineering & Management, I Semester**		
Course Title	**Data Analytics**		
Course Code	**PR651**	**No. of Credits**	**04**
Course Code of Pre-requisite subject(s)	**---**	**---**	**---**
Session	**July 2021**	**Section (if, applicable)**	**-**
Name of Faculty	**Dr. P.Karthik / Dr. M.Saravana Kumar**	**Department**	**Production Engineering**
Email	**pkarthik@nitt.edu/ mskumar@nitt.edu**	**Telephone No.**	**+91 9444785463/ +918883289996**
Name of Course Coordinator(s) (if, applicable)	**-**		
E-mail	**-**	**Telephone No.**	**-**
Course Type	✓ **Core course**	☐ **Elective course**	

Syllabus (approved in BoS)

PR651 Data Analytics

Introduction to Multivariate Statistics-Degree of Relationship among Variables-Review of Univariate and Bivariate Statistics-Screening Data Prior to Analysis-Missing Data, Outliers, Normality, Linearity, and Homoscedasticity.

Multiple Regression- Linear and Nonlinear techniques- Backward-Forward-Stepwise Hierarchical regression-Testing interactions (2way interaction) - Analysis of Variance and Covariance (ANOVA & ANCOVA) - Multivariate Analysis of Variance and Covariance (MANOVA & MANCOVA).

Logistic regression: Regression with binary dependent variable -Simple Discriminant Analysis-Multiple Discriminant analysis-Assessing classification accuracy- Conjoint analysis (Full profile method).

Principal Component Analysis -Factor Analysis- Orthogonal and Oblique Rotation Factor Score Estimation-Multidimensional Scaling-Perceptual Map-Cluster Analysis (Hierarchical Vs Nonhierarchical Clustering).

Latent Variable Models an Introduction to Factor, Path, and Structural Equation Analysis- Time series data analysis (ARIMA model) – Decision tree analysis (CHAID, CART) - Introduction to Big Data Management.
COURSE OBJECTIVES
o To realize the importance of data analytics. o To gain competence on data analytics packages. o To explore industrial applications of data analytics methodologies.
COURSE OUTCOMES (CO)

Course Outcomes	**Aligned Programme Outcomes (PO)**
1. To recognize the importance of data analytics. To exhibit competence on data analytics packages.	Unit-I, II, III
2. To apply solution methodologies for industrial problems.	Unit-IV & V

COURSE PLAN – PART II			
COURSE OVERVIEW			
The aim of this course is to recognize the importance of data analytics and to Exhibit competence on data analytics packages and also to apply solution methodologies for industrial problems.			
COURSE TEACHING AND LEARNING ACTIVITIES			
S.No.	**Week/Contact Hours**	**Topic**	**Mode of Delivery**
1	Week-1	Introduction to Multivariate Statistics	Online mode of teaching
		Degree of Relationship among Variables	
		Review of Univariate	
		Bivariate Statistics	
2	Week-2	Screening Data Prior to Analysis	Online mode of teaching
		Missing Data	
		Outliers	
3	Week-3	Normality	Online mode of teaching
		Linearity	
		Homoscedasticity	
4	Week-4	Multiple Regression	Online mode of teaching
		Linear and Nonlinear techniques	
		Backward-Forward-Stepwise	
5	Week-5	Hierarchical regression	Online mode of teaching
		Testing interactions (2way interaction)	
		Analysis of Variance and Covariance (ANOVA & ANCOVA)	
6	Week-6	Multivariate Analysis of Variance and Covariance (MANOVA & MANCOVA)	Online mode of teaching

		Logistic regression	
		Regression with binary dependent variable	
7	Week-7	Simple Discriminant Analysis	Online mode of teaching
		Multiple Discriminant analysis	
		Assessing classification accuracy	
8	Week-8	Conjoint analysis (Full profile method).	Online mode of teaching
		Principal Component Analysis	
		Factor Analysis	
9	Week-9	Orthogonal and Oblique Rotation	Online mode of teaching
		Factor Score Estimation	
		Multidimensional Scaling	
10	Week-10	Perceptual Map	Online mode of teaching
		Cluster Analysis (Hierarchical Vs Nonhierarchical Clustering)	
		Latent Variable Models an Introduction to Factor	
11	Week-11	Path, and Structural Equation Analysis	Online mode of teaching
		Time series data analysis (ARIMA model)	
		Decision tree analysis	
12	Week-12	CHAID	Online mode of teaching
		CART	
		Introduction to Big Data Management.	

COURSE ASSESSMENT METHODS (shall range from 4 to 6)

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Assignment	Week-4	---	20
2	Cycle test -1	Week-7	60 Minutes	25
3	Cycle test -2	Week-10	60 Minutes	25
CPA	Compensation Assessment*	Week-12	60 Minutes	25
4	Final Assessment *	Week-14	180 Minutes	30
	Final Assessment for grading			100

***mandatory; refer to guidelines on page 5**

COURSE EXIT SURVEY (mention the ways in which the feedback about the course shall be assessed)

- Feedback from the students during class committee meetings
- Anonymous feedback through questionnaire (Mid of the semester & End of the semester) optional

COURSE POLICY (preferred mode of correspondence with students, compensation assessment policy to be specified)

MODE OF CORRESPONDENCE (email/ phone etc)

- All the students are advised to check their NITT WEBMAIL regularly. All the correspondence (schedule of classes schedule of assessment course material any other information regarding this course) will be done through their webmail only.
- Queries may be emailed to the course coordinator directly at evangeline@nitt.edu.

COMPENSATION ASSESSMENT POLICY

- If any of the students is absent for continuous assessment due to genuine reason, those absentees are allowed to attend the Compensatory assessment.
- In any case, Compensation Assessment* will not be considered as an improvement test.

ATTENDANCE POLICY (A uniform attendance policy as specified below shall be followed)

- **At least 75% attendance in each course is mandatory.**
- **A maximum of 10% shall be allowed under On Duty (OD) category.**
- Students with **less than 65% of attendance** shall be prevented from writing the final assessment and **shall be awarded 'V' grade.**

ACADEMIC DISHONESTY & PLAGIARISM

- Possessing a mobile phone, carrying bits of paper, talking to other students, copying from others during an assessment will be treated as punishable dishonesty.
- Zero mark to be awarded for the offenders. For copying from another student, both students get the same penalty of zero mark.
- The departmental disciplinary committee including the course faculty member, PAC chairperson and the HoD, as members shall verify the facts of the malpractice and award the punishment if the student is found guilty. The report shall be submitted to the Academic office.

The above policy against academic dishonesty shall be applicable for all the programmes.
ADDITIONAL INFORMATION
Students should refer more books for in-depth knowledge about the course.
FOR APPROVAL
Course Faculty _____ **CC-Chairperson** _____ **HOD** _____

Guidelines:

a) The number of assessments for a course shall range from 4 to 6.

b) **Every course shall have a final assessment on the entire syllabus with at least 30% weightage.**

c) **One compensation assessment for absentees in assessments (other than final assessment) is mandatory. Only genuine cases of absence shall be considered.**

d) **The passing minimum shall be as per the regulations.**

B.Tech. Admitted in				P.G.
2018	**2017**	**2016**	**2015**	
35% or class average/2 whichever is greater.		Peak/3 or class average/2 whichever is lower		40%

e) **Attendance policy and the policy on academic dishonesty & plagiarism by students are uniform for all the courses.**

f) **Absolute grading policy shall be incorporated if the number of students per course is less than 10.**

g) Necessary care shall be taken to ensure that the course plan is reasonable and is objective.